


# Parenting style during childhood is associated with the development of chronic pain and a patient's need for psychosomatic treatment in adulthood

## A case-control study

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### Abstract

The aim of this study is to investigate the relation between parenting style and chronic pain and the patients' need for psychosomatic treatment in adulthood.

We compared 4 combinations of 2 parenting style subscales, high and low care and overprotection, among the following 4 age- and sex-matched groups: community-dwelling subjects without chronic pain (n=100), community-dwelling subjects with chronic pain (n=100), outpatients with chronic pain (n=50), and inpatients with chronic pain (n=50). Parenting style was assessed for both the mother and father by use of the Parental Bonding Instrument questionnaire. The parenting style associated with the worst outcome was defined as both low care and high overprotection, as reported in previous studies.

The frequency of reported adverse parenting style was significantly higher among chronic pain patients than community-dwelling subjects without chronic pain (all  $P < .05$ ). The odds ratios for an adverse parenting style significantly increased through the categories after adjusting for demographic factors and the pain visual analog scale ( $P$  for trend  $< .01$ ).

These findings suggest that parental low care and high overprotection during childhood contribute to the future risk of chronic pain and the patients' need for psychosomatic treatment in adulthood.

**Abbreviations:** CI = confidence interval, ORs = odds ratios, PBI = Parental Bonding Instrument, VAS = visual analog scale.

**Keywords:** attachment, care, chronic pain, overprotection, parenting

## 1. Introduction

Chronic pain is a common problem, with prevalence estimates of about 40% in population studies.<sup>[1,2]</sup> Chronic pain is also known to have a complex bidirectional causal-effect relationship of

biological, psychological, and social factors.<sup>[3–5]</sup> Therefore, it is important to identify the psychosocial factors associated with the development and persistence of chronic pain and pain behavior to minimize its negative impact on the quality of life.

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One potential contributing factor to the development and maintenance of chronic pain is represented by adverse experiences during childhood. Infancy, childhood, and adolescence are critical developmental periods, characterized by high vulnerability to stressors.<sup>[6]</sup> Several clinical studies have shown that an adverse childhood experience, such as parental loss or abuse in childhood, is a risk factor for the development of ischemic heart disease, gastrointestinal disorders, and chronic pain-related problems in adulthood.<sup>[7–9]</sup> Recent epidemiological and clinical studies have reported that exposure to an adverse parenting style during childhood affects the development of the brain and body and increases the future risk of various forms of psychophysiological disorders, such as suicide, mood disorder, obsessive-compulsive disorder, sleep disorder, and inflammatory bowel disease.<sup>[10–14]</sup> However, there have been few studies addressing the relationship between parenting style and chronic pain.

The aim of this study is to investigate the relation between chronic pain and care, overprotection, and 4 parenting style combinations and the need for psychosomatic treatment in adulthood by comparing groups of community-dwelling subjects without pain, community-dwelling subjects with chronic pain, and in- and outpatients with chronic pain.

## 2. Methods

### 2.1. Participants

The participants were consecutive patients who visited the Department of Psychosomatic Medicine at Kyushu University Hospital from June 2009 to February 2013 who had chronic pain as their chief complaint. Eligibility criteria included: a  $\geq 3$ -month history of pain; being 35 years old or older; and willingness to participate in the study. Exclusion criteria included: the presence of psychotic symptoms and an inability to read and write Japanese.<sup>[15]</sup> As a consequence, 51 inpatients and 93 outpatients with chronic pain consented to participate the present study and filled out the questionnaires. None of the subjects included in the category “outpatients with chronic pain” were admitted to our hospital for treatment during the study period.

The community-based sample was selected among the participants of the ongoing Hisayama Study, a prospective cohort study that has been conducted in the homonymous town since 1961 and corresponding to the same geographic area of the patient groups.<sup>[16]</sup> In 2011, 2278 residents aged 39 years or older participated in an annual health check-up, of whom 840 (36.9%) gave consent for inclusion in our study.<sup>[17]</sup> A total of 109 individuals were excluded for the following reasons: incomplete questionnaires, parental death during childhood, no contact with one or both parents during childhood, lack of ratings for one or both parents on the parenting questionnaire. The remaining 731 participants (279 without pain, 148 with acute pain and 335 with chronic pain) were eligible for the present study.

From 51 inpatients and 93 outpatients from Kyushu University hospital and 731 community-dwelling subjects, a total of 300 individuals were randomly selected for the present analysis using a computer-generated random number from each pain category by matching for age (5-year interval) and sex in a 1:2:2 ratio for outpatient ( $n=50$ ), community-dwelling subjects without pain ( $n=100$ ), and community-dwelling subjects with chronic pain ( $n=100$ ) against 50 inpatients (one inpatient was not included because there was no appropriately matched subject in the outpatients category).

This study was conducted with the approval of the Kyushu University Institutional Review Board for Clinical Research. Written informed consent was obtained from all participants.

### 2.2. Assessment of parenting style

The perceived parenting styles were measured using the Parental Bonding Instrument (PBI), a self-report questionnaire with 25 items that measure the parenting style during the first 16 years of life, as recalled by the respondent.<sup>[18]</sup> The PBI is scored separately for the father and mother to evaluate the relation between the respondent and each of their parents as they subjectively perceive them. The respondents are asked to score the attitudes and behaviors of each parent separately using a 4-point Likert scale. Two subscales of parenting style are measured by the PBI: Care and Overprotection. The “care” subscale reflects perceived parental warmth, affection, and involvement contrasted with coldness and rejection. The “overprotection” subscale reflects perceived parental psychological over-control and intrusion contrasted with encouragement of psychological autonomy and exploration of the environment. We dichotomized the care and protection scores according to the cutoff point suggested by Parker et al: low care  $< 24.0$  for fathers and  $< 27.0$  for mothers; high overprotection  $\geq 12.5$  for fathers and  $> 13.5$  for mothers.<sup>[19]</sup> In order to account for the interaction between the care and overprotection subscales, we dichotomized each subscale by the cut-point and combined them into 4 previously reported patterns of paternal and maternal parenting style: “optimal bonding” (high care and low overprotection), “affectionate constraint” (high care and high overprotection), “neglectful parenting” (low care and low overprotection), and “affectionless control” (low care and high overprotection).<sup>[20,21]</sup> The PBI score reflects the actual parenting attitude, based on studies using corroborative witnesses and independent observers.<sup>[18,22]</sup> The PBI and its subscales have a high level of test–retest reliability and internal consistency.<sup>[23]</sup> The Japanese version of the PBI has also been shown to have adequate validity.<sup>[24]</sup>

### 2.3. Assessment of chronic pain

The International Association for the Study of Pain (IASP) defines pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage” and also explains that “Pain is always subjective.” No definition of “chronic” pain based on duration has been clearly established, but 3 to 6 months or more is generally used.<sup>[25,26]</sup> According to this definition, we asked the participants if they were currently experiencing pain, then asked about the duration of any pain reported. We defined chronic pain as pain that had been present for  $\geq 3$  months. Participants were also asked to rate the average intensity of their pain in the past week on a visual analog scale (VAS). The anchors were “No pain” (0mm) and “Pain as bad as it could be” (100mm). The VAS for pain has been shown to be a reliable and valid measure of pain intensity.<sup>[27]</sup>

### 2.4. Demographic variables

The following demographic variables were collected by a self-administered questionnaire; age, sex, marital status (without partner: never married, divorced, separated or widowed/with

**Table 1**  
**Demographic and clinical characteristics of the 4 groups of community-dwelling subjects and chronic pain patients.**

	Community-dwelling subjects		Patients with chronic pain		P for trend*
	Without pain n=100	With chronic pain n=100	Outpatients n=50	Inpatients n=50	
Age (year)	52.1 ± 8.0	50.3 ± 8.7	50.0 ± 10.1	49.8 ± 10.0	—
%Sex					
Male	24.0	24.0	24.0	24.0	—
Female	76.0	76.0	76.0	76.0	
%Marital status					0.007
Without partner	19.0	17.0	24.0	44.0 <sup>†</sup>	
With partner	81.0	83.0	76.0	56.0 <sup>†</sup>	
%Educational levels					0.51
≤9 y	4.0	7.0	6.0	6.0	
>9 y	96.0	93.0	94.0	94.0	
Pain visual analog scale, mm	0 (0–0)	37 (23–50) <sup>‡</sup>	62 (40–84)	75 (60–91) <sup>†</sup>	<0.001

Values are means ± SD, frequencies, or median (interquartile range). P values between groups were estimated by  $\chi^2$  test (for frequencies) or Mann–Whitney U test (for pain visual analog scale).

\*The trends across groups were tested by logistic regression analysis (for frequencies of Marital status and educational level), or Jonckheere–Terpstra trend test (for pain visual analog scale).

<sup>†</sup> P < .05 between outpatients and inpatients.

<sup>‡</sup> P < .05 between community-dwelling subjects with and without chronic pain.

partner: married or cohabiting), and education (≤9, 10–12, or >12 years).

### 2.5. Statistical analysis

In this study, it was assumed that the “clinical pain level” (ie, the severity of chronic pain and the need for psychosomatic treatment) would rise in the following 4 hierarchies: community-dwelling subjects without chronic pain, community-dwelling subjects with chronic pain, outpatients with chronic pain, and inpatients with chronic pain. Trend tests for the participant characteristics and levels of pain were done between the 3 groups, as follows: non-parametric ordinal variables (eg, care score, overprotection score, and VAS) by the Jonckheere–Terpstra trend test, and dichotomous variables (eg, marital status and educational level) by logistic regression analysis. To test dose–response associations between the 4 groups (elevated clinical levels of pain) and the PBI subscale (care and overprotection) scores, we performed the Jonckheere–Terpstra trend test. The frequency of each PBI pairing was calculated for each of the 4 groups and for each parent, and was compared among the 4 groups and for each parent by conditional logistic regression analysis. Odds ratios (ORs) and their 95% confidence intervals (CI) for the “affectionless control” pattern (low care, high overprotection) of the 3 chronic pain groups were compared with those of the age- and sex-matched community-dwelling subjects without chronic pain by estimation with conditional logistic regression analysis (model 1), then adjustment was done for the demographic variables marital status (with or without partner) and educational level (>9 years or not) (model 2), and for the VAS pain scale (continuous variable) in addition to the covariates included in model 2 (model 3). Trends in the ORs across the 4 subject categories were tested by adding 1 ordinal variable of the 4 categories to the relevant logistic model. The SAS software package version 9.3 (SAS Institute, Cary, NC) was used for all analyses. Two-sided values of P < .05 were considered significant.

### 3. Results

The characteristics of the 4 groups are summarized in Table 1. The frequency at which a subject was found to be without a partner and

the median value of the pain on VAS was significantly different among the 4 subject groups: highest in the inpatient group (75 mm), followed by the outpatient group (62 mm) and the community-dwelling group with pain (37 mm). No significant differences in educational level were found among the 4 groups. Three of the 91 (3.3%) community-dwelling subjects with chronic pain (9 missing data) had received treatment at a clinic or hospital that specializes in psychosomatic medicine.

Figure 1 shows a comparison of the median scores for paternal or maternal care with overprotection for the 4 age- and sex-matched groups. The paternal care scores significantly decreased, and the paternal overprotection score significantly increased with elevation of the clinical stages of chronic pain (both P for trend <.001). Likewise, a higher level of clinical pain was significantly associated with a lower maternal care score and a higher maternal overprotection score (both P for trend <.001). These associations were found equally for men and women.

We compared the proportions of the parenting patterns for the fathers and mothers by the 4 combinations of care and overprotection among 4 age- and sex-matched groups based on the clinical stages of chronic pain, as shown in Figure 2. The proportions for the paternal affectionless-control pattern were significantly different, increasing from 14% in the community-dwelling group without pain to 23% in the community-dwelling group with pain, to 34% in the outpatient group, and to 46% in the inpatient group (P for trend <.001). This association remained unchanged after adjusting for demographic factors (model 2) and after additionally adjusting for the pain score from VAS as pain intensity (Table 2). In contrast, the proportion of “optimal bonding” (high care and low overprotection) was significantly lower in the out- and in-patient groups than in the group of community-dwelling subjects without pain (both P <.05). The proportion of “neglectful parenting” (low care and low overprotection) was significantly higher in the outpatient group than in the community-dwelling group without pain, whereas it tended toward being lower in the inpatient group than in the outpatient group (P = .1). A similar tendency of the findings was observed for maternal parenting style.

To gain additional information, we compared the frequency of the “affectionless-control” parenting pattern according to the

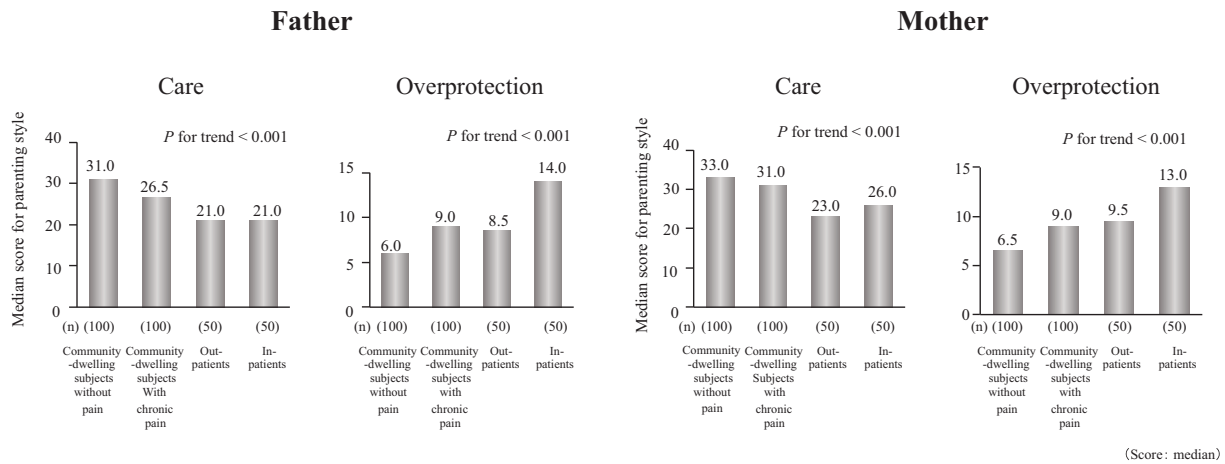


Figure 1. The median scores of parental care and overprotection for community-dwelling subjects and chronic pain patients.

existence or nonexistence of chronic pain and clinical consultation. The frequencies of the “affectionless control” parenting pattern were 31.5% for the father and 26.5% for the mother in a combined chronic pain group (all 3 groups with chronic pain), 14.0% for the father and 12.0% for the mother in the community-dwelling subjects without pain group, 40.0% for the father and 33.0% for the mother in the patient group (both outpatients and inpatients), and 18.5% for the father and 16.0% for the mother in the 2 community-dwelling population groups. All of these differences between the dichotomized groups were significant by  $\chi^2$  test ( $P < .05$ , Supplementary table. 1, <http://links.lww.com/MD/E551>).

#### 4. Discussion

To our knowledge, this is the first study to examine the association between perceived parenting styles during childhood and chronic pain in adulthood by comparing the perceived parenting styles of community-dwelling subjects without pain,

community-dwelling subjects with chronic pain, outpatients whose chief complaint is chronic pain, and inpatients whose chief complaint is chronic pain. The proportion of participants reporting low care and excessive overprotection (affectionless control) was 2 to 3 times higher in the 2 patient groups than in the group of community-dwelling subjects without chronic pain, after controlling for demographic variables. The prevalence of the “low care and excessive overprotection” parenting pattern significantly increased as the clinical stages of chronic pain elevated. These associations remained significant after controlling for pain intensity. The findings of this study suggest that an adverse parenting style, such as “low care and excessive overprotection”, during childhood contributes to the development and persistence of chronic pain and affects the patient’s need for clinical care in adulthood, in addition to the degree of pain intensity.

The “affectionless control” pattern has been proposed by Parker et al<sup>[20]</sup> and confirmed by Sato et al<sup>[21]</sup> as a maladaptive form of parenting that results in a particular vulnerability to the

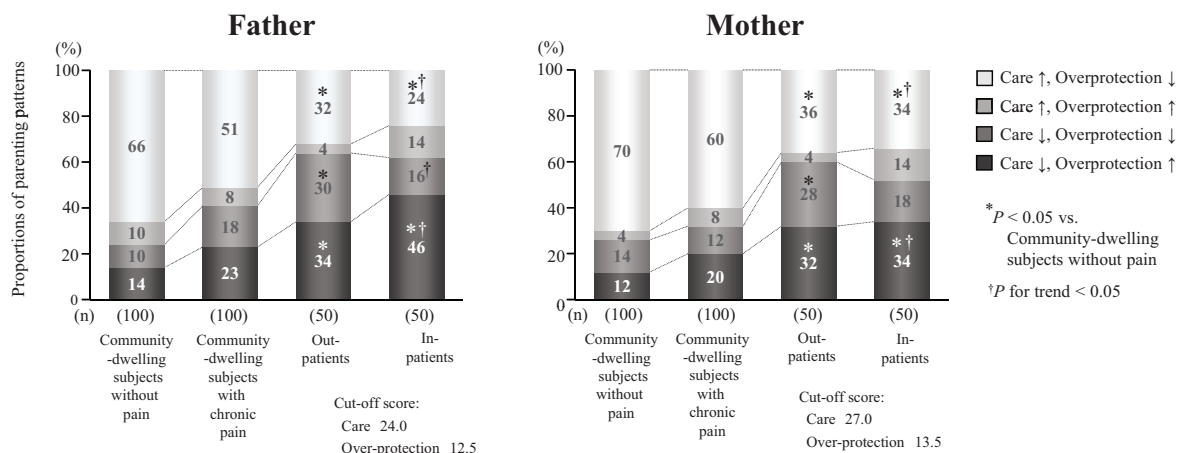


Figure 2. The frequency of the combined parenting patterns of community-dwelling subjects and chronic pain patients. Cutoff point: low care  $< 24.0$  for fathers and  $< 27.0$  for mothers; high overprotection  $\geq 12.5$  for fathers and  $\geq 13.5$  for mothers. Differences in the existence or non-existence of the low care - high overprotection pattern reported by the 3 pain groups versus the community-dwelling subjects without pain were analyzed using conditional logistic regression analysis matched for age and sex and adjusted for marital status and educational level.

**Table 2**  
**Odds ratios (95%CI) for the combined low care and high over-protection parenting pattern of the three chronic pain groups compared with the community-dwelling subjects without pain.**

Groups	No. of participants	No. of LCHOP pattern	Model 1		Model 2		Model 3	
			OR (95% CI)	P	OR (95% CI)	P	OR (95% CI)	P
<b>Father</b>								
Community-dwelling subjects without pain	100	14	1.00 (Reference)		1.00 (Reference)		1.00 (Reference)	
Community-dwelling subjects with chronic pain	100	23	1.81 (0.88–3.72)	.11	1.76 (0.85–3.65)	.13	1.83 (0.75–4.44)	.18
Outpatients	50	17	3.03 (1.36–6.73)	.007	2.87 (1.27–6.49)	.01	3.05 (0.94–9.88)	.06
Inpatients	50	23	4.79 (2.20–10.39)	<.001	4.12 (1.88–9.05)	<.001	4.43 (1.24–15.84)	.02
P for trend				<.001		<.001		.02
<b>Mother</b>								
Community-dwelling subjects without pain	100	12	1.00 (Reference)		1.00 (Reference)		1.00 (Reference)	
Community-dwelling subjects with chronic pain	100	20	1.80 (0.84–3.87)	.13	1.78 (0.83–3.86)	.14	2.76 (1.06–7.16)	.04
Outpatients	50	16	3.31 (1.44–7.63)	.005	2.99 (1.27–7.02)	.01	5.79 (1.71–19.61)	.005
Inpatients	50	17	3.61 (1.58–8.28)	.002	3.04 (1.30–7.12)	.01	6.77 (1.74–26.25)	.006
P for trend				<.001		.004		.004

CI=confidence interval, LCHOP=low care, high overprotection, OR=odds ratio.

Model 1: Matched by age and sex.

Model 2: Model 1 + marital status and educational level.

Model 3: Model 2 + pain visual analog scale.

occurrence of psychopathology. The finding of the present study is consistent with that of a previous study that examined the association between affectionless control and inflammatory bowel disease, which may cause chronic pain.<sup>[14]</sup> Additionally, several studies have been conducted on the relation between chronic pain and “insecure attachment,” which is known to be significantly affected by the parenting style (low care and high overprotection).<sup>[28,29]</sup> These previous studies suggested that insecure attachment represents both a risk factor for the development of chronic pain and a vulnerability factor for poor outcome in the face of chronic pain.<sup>[30,31]</sup> Although these studies did not directly evaluate parenting, our results seem to be consistent with their findings.

The mechanism underlying the complex interplay between parenting style and chronic pain should be conceptualized with a multidimensional approach encompassing biological, psychological, and social factors.<sup>[4,32]</sup> Previous clinical cross-sectional studies suggested that childhood exposure to adverse environmental factors such as early stress and insecure attachment, which is known to be closely related to inadequate parenting,<sup>[28,29]</sup> may influence biological factors (eg, hypothalamic-pituitary-adrenal axis, sympathetic nervous system, inflammation, immune status, and central nervous system).<sup>[33,34]</sup> Previous review studies about the mechanisms of pain also suggested that these biological factors are associated with chronic pain.<sup>[35,36]</sup> These findings indicate that these biological factors may mediate the association between inadequate parenting and chronic pain. Similarly, an increasing amount of evidence has shown the importance of psychological factors such as adverse parental bonding in the development of depression and anxiety in adulthood.<sup>[11,21,37]</sup> Depression has been recognized as a risk factor for chronic pain.<sup>[38]</sup> Anxiety is likely to increase the patient’s need for medical treatment against the pain and its concomitant symptoms; therefore, it is possible that depression and anxiety mediate the association between inadequate parenting and the development of chronic pain that needs psychosomatic treatment. In addition, the parenting pattern “low care and high overprotection” has been reported to be linked to

the personality traits of adults, such as alexithymia and subsequent chronic pain.<sup>[39]</sup> Considering the possible underlying social factors, subjects who experienced low care during childhood tend to experience interpersonal stress and fail to get adequate social support in adulthood<sup>[40]</sup>; arguably, considering the close relationship between inadequate parenting and insecure attachment,<sup>[28,29]</sup> the latter could mediate the observed association. Kolb<sup>[41]</sup> labeled “Shopping for interventions” as “Attachment searching” and suggested that the behavior could result from failure to form a secure therapeutic relationship with a health specialist. Meredith et al summarized that people who have insecure attachment maintain persistent pain and pain behavior.<sup>[31]</sup> Therefore, we speculate that people with chronic pain who experienced inadequate parenting during childhood may receive less social support and that they tend to shop for clinical intervention by psychosomatic physicians in adulthood, in contrast with people with secure attachment who can cope with their pain symptoms by receiving support from their family, friends, or a local doctor.

We found that the frequency of patients reporting the “affectionless-control” parenting pattern (ie, low care and high overprotection) significantly increased along with the clinical stages of chronic pain, even after adjustment for pain intensity. Patients’ needs for clinical care (eg, visiting clinic or hospitalization) seem to be affected by not only pain intensity but also by parenting related biopsychosocial problems, such as physical comorbidity (eg, disability of daily life, autonomic dysregulation symptoms, and so on),<sup>[42]</sup> mental comorbidity (eg, depression, anxiety and sleep disorder, among others), and cognitive behavioral and interpersonal problems.<sup>[43]</sup> Therefore, we think it is important that therapists, when treating patients with chronic pain, take into consideration the possibility that their patients may have experienced the “affectionless-control” parenting pattern and its related biopsychosocial consequences.

In the present study, the proportion of paternal “neglectful parenting” was higher in the outpatient group than the inpatient group, although the difference did not reach statistical significance. The exact reasons of this finding are unclear, but we

believe that it is clinically meaningful. Counseling by an expert psychologist, psychosomatic doctor, or psychiatrist or empathy from another person seems to result in improvement of the symptoms of chronic pain without hospital admission of patients raised in an atmosphere of “neglectful parenting”; thus such patients may need and be satisfied with “care” that includes empathy, warmth, and affection. In contrast, patients raised with “affectionless-control” may require more intensive psychological treatment to become free from internalized negative cognitions caused by repetitive parental messages in childhood, in addition to such “care” in a hospitalized environment.

This study has some limitations. First, we did not assess the causes of pain. It will be informative to explore whether or not the magnitude of the associations between parenting and chronic pain is different between participants with pain disorders that have or do not have  $\geq 1$  established biological causes. Second, because we have no detailed data about the duration of pain for the community dwelling participants, we were unable to adjust the duration of pain. Thus, we were not able to clarify the role duration of pain plays in the association between parenting and chronic pain.

## 5. Conclusions

Our results suggest that the “affectionless-control” parenting style during childhood may contribute to the development, persistence, and need for psychosomatic treatment of chronic pain in adulthood. Social support and mass-education on parenting for optimal bonding and secure attachment may be among the most promising preventive initiatives for chronic pain from the view of global health and economic burden. Furthermore, we suggest that social pain of the “affectionless-control” parenting style and its related biopsychosocial consequences should be taken into consideration in the treatment of patients with intractable chronic pain. Further prospective and interventional studies are needed to confirm this hypothesis.

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## Author contributions

MS contributed to the study design; did the data collection, analysis, and data interpretation; drafted the first report; and edited the report drafts. TN contributed to the study design; did data interpretation; and edited the report drafts. HK and RI contributed to the study design; did the data collection and analysis. KA and RS did the data collection. CK, YK and NS contributed to data interpretation and edited the report drafts. MH contributed to the data collection and data interpretation; edited the report drafts. All authors read and approved the final manuscript.

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